MATH 330   Algebraic Thinking with Technology

1.   <u>Catalog Description</u>

MATH 330 Algebraic Thinking with Technology   **4 units**

Prerequisite: MATH 329.

Algebraic concepts for elementary teachers. Mathematical patterns, equations and inequalities, linear and quadratic functions, exponential and logarithmic functions, systems of equations, roots of polynomials, factoring of polynomials, and right-triangle trigonometry. Computer applications. 4 lectures.

2.   <u>Required Background or Experience</u>

Successful completion of Math 329 or consent of instructor.

3.   <u>Learning Objectives</u>

The student should:

a. Use the language of mathematics (i.e., terminology, symbols, and notation) to express mathematical ideas.
b. Use and understand basic properties of elementary functions: polynomials, rational, exponential, and logarithmic.
c. Use and understand the basic algebraic principles of graphing.
d. Solve linear and quadratic equations and inequalities.
e. Become familiar with algebraic concepts through the use of technology, discussion, reflection, and hands-on activities.
f. Use multiple representations (pictures, tables, graphs, formulas, words) to solve algebraic problems.
g. Describe, analyze, and generalize mathematical patterns.

4.   <u>Text and References</u>

- Sowder, J., Sowder, L. & Nickerson, S. *Reconceptualizing Mathematics for Elementary School Teachers*, W.H. Freeman and Co., New York, NY.
- Kunkel, Paul, et.al., *Exploring Algebra 1 with The Geometer's Sketchpad*, Key Curriculum Press.
- Kunkel, Paul, et.al., *Exploring Algebra 2 with The Geometer's Sketchpad*, Key Curriculum Press.
- Scher, Daniel, et.al., *Exploring Precalculus with The Geometer's Sketchpad*, Key Curriculum Press.

5.   <u>Minimum Student Materials</u>

Paper, pencils, and notebook.

6.   <u>Minimum University Facilities</u>

Classroom with ample chalkboard space for class use and student access to computers.

7.   <u>Content and Method</u>

<u>Topic</u>   <u>Lecture</u>

a. **Functions*** Definition Transformations Exponential	11
b. **Rectangular Coordinate System**** Solving & Graphing Linear equations Systems of Two Linear Equations Rate of change Inequalities	10
c. **Polynomials** Quadratic equations Fundamental Theorem of Algebra Rational and Irrational Roots of Polynomials Inequalities	7
d. **Conics** Circle Parabola Ellipse	3
e. **Trigonometry**	2
Total	33

*Topics in sections 12.3, 12.4 and 13.4 of Sowder et. al will be covered.
** Topics in sections 13.2, 13.3, 14.1, and 14.3 of Sowder et. al will be covered.

8.   <u>Methods of Assessment</u>

The primary methods of assessment are: essay examinations, quizzes, activities, and homework.

9.   <u>Additional Comments</u>

The use of technology suggests that students' attendance is vital for development and understanding of the concepts of this class.

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